DOCUMENT RESUME

ED 429 814 SE 062 350

AUTHOR Barry, Dana M.
TITLE Innovative Hands-on Activities for Middle School Science.
PUB DATE 1999-03-00
NOTE 7p.; Paper presented at the Annual Meeting of the National Science Teachers Association (Boston, MA, March 25-28, 1999).
PUB TYPE Guides - Classroom - Teacher (052) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Art; *Hands on Science; *Integrated Curriculum; *Interdisciplinary Approach; Language Arts; *Middle Schools; *Science Activities; *Science Education

ABSTRACT

This paper contains some hands-on activities that relate science to art and language arts. The focus is placed on middle schools and activities engage students in the discovery that chemicals are used to draw and color. Students also read and write poetry and literature that employ science-related topics. A number of spin-off activities are suggested for both art and language arts that involve food dye, candy, and other easily available materials. (DDR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 429 814

Innovative Hands-On Activities For Middle School Science

By

DANA M. BARRY, Ph.D., C.P.C

(Clarkson University)

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

D. Barry

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Presentation at the NSTA National Convention in Boston, MA
March 28, 1999

Sponsored by Clarkson University's Center for Advanced Materials Processing (CAMP)

SE 063 350

BEST COPY AVAILABLE

Introduction

Turn students on to science through exciting activities that relate to daily life. The sky is the limit for captivating ideas because science surrounds us and relates to everything. We eat, drink and wear chemicals. Our health, weather conditions, soil, forms of transportation, and pets can be thought of as science. Some interesting hands-on activities that relate science to two areas of the curriculum are presented.

Science and Art

Have the students discover that chemicals are used to draw, color and create wonderful works of art. Mention that pencils used to make sketches contain the element carbon in the form of graphite. One can create unique colors by mixing together various amounts of food dyes (chemicals). Consider the following activity. Add two drops of yellow food dye to a transparent plastic cup filled half way with water and stir. Next add two drops of blue food dye to another transparent plastic cup filled half way with water and stir. Now simultaneously pour the contents of both cups into a third cup of the same type. A beautiful green color is the result of mixing the yellow and blue food dyes together. Repeat this activity using red and blue food dyes. The net result is a beautiful purple color. Mix other food dyes together and note what happens. A variation on this activity would be to use colored plastic containers in place of some of the food dyes. For example add some blue colored water to a yellow colored plastic container. The contents of the container look green. Have the students try this activity using different food dyes and plastic containers of various colors. Display all of the data and color schemes on a chart and

share it with the class.

Beautiful pictures can be painted using charcoal and plant pigments contained in beets, beet greens and blue berries. Place raw beets, beet greens and blue berries into separate microwave dishes. Add some water to each dish and microwave for a few minutes to prepare colored juices for painting. One can finger paint or use cotton swabs to create a master piece of art. When using the charcoal, it is easier to rub a wet cotton swab across it to obtain the desired color. The black color in the charcoal is due to carbon, the green color in the beet greens is from chlorophyll, and the red and blue colors are due to chemicals known as flavonoids. Also have the students paint using colors from other fruits and vegetables. Display the paintings and prepare a chart listing fruits and vegetables. For each fruit and vegetable, note the color provided for painting and the chemical responsible for it. The chemicals can be found in a Chemical Dictionary.

Colors can also be separated into their component parts by a technique called paper chromatography. An activity using this technique is described. First obtain the following materials: a paper cup filled half way with water, a paper towel strip about one inch wide and three inches long, small bottles of red and blue food coloring, one sheet of writing paper and two tooth picks. Place one drop of red food coloring on the sheet of paper. Then place one drop of blue food coloring on top of the red drop. Mix the two drops of food coloring together using a tooth pick. Place the tip of a clean tooth pick into the mixed food coloring and use it to make a small colored in circle, in the center of the paper towel strip. Hold the strip of paper towel in the cup of water in such a way that the colored circle is not in the water. Watch the fast color separation take place. Note that the red color is on the bottom while the blue is on top. This result indicates that the red coloring has a larger mass than the blue. The paper strip can be referred to as a paper chromatogram.

Science and English

One learns and communicates science through English by reading, listening, writing and speaking. Students, who learn science by reading books, can also learn science from poems. Consider the poem entitled "Gold."

Gold

by

Dana M. Barry

A precious element is gold.
Those who possess it feel proud and bold.
It is symbolized by Au and treasured by the young and old.
It is a shiny metal used in jewelry I am told.
Gold's elegance is truly a sight to behold.

This short poem informs students that gold is an element and a metal with the symbol Au. It also states that gold is shiny and used in jewelry. Read this and/or other poems to your students. Children can learn science by reading and listening to poems. Have them create a short poem of their own about science. Volunteers can read their poems in class. Children also learn science by listening to science education music cassettes such as *Chemical Sensation with the Barry Tones* by Dr. Dana M. Barry (1996). This tape contains songs about chemicals, acids, bases, the periodic table, and science in general.

An exciting activity that will enhance your students' creativity and thinking skills is to have them invent a new planet. They will love this. To start, show them some colorful photos of planets like Earth, Mars, and Jupiter. Then give them some background information about these planets. You can mention that our planet Earth contains air, water, land and humans. It has one moon and gets its heat and light from the sun. Tell the children that Mars is the most Earth like of all the planets. It is a small rocky planet known as the Red Planet. Mars has the largest volcanic mountain in the solar system and is named after the Roman God of War. Jupiter is the largest planet and has an immense magnetic field. It has sixteen moons, a ring system, and was named after the King of the Roman Gods. Ask the students to create planets of their own. Tell them to name the planet, write a description of the planet (which includes life forms, size, presence of water, number of moons, etc.), and to draw and color a picture of it and its inhabitants. Have the students share their creations with the class. You will be very surprised to find out how creative your students really are.

People obtain the science information that they write and speak about by using the senses of smelling, touching, tasting, seeing and hearing. An interesting activity to exemplify this makes use of a grab bag. First place a unique object(s) in a brown bag. Close the bag so that the object(s) can't be seen. Then have students volunteer to verbally identify/describe the contents of the bag by feeling its unseen items with their hands. The information they obtain mainly comes from the sense of touching.

To obtain data using many of the senses, have each student analyze a candy worm. Materials needed for this activity include candy worms, white construction paper, pencils, rulers, and magnifiers. Ask the children to closely examine their worms with magnifiers. Have them note the physical properties of the worms (ex. color, number of rings, presence of eyes, etc.) and

record all data. Next have them determine the stretched and unstretched lengths of their worms by placing them on the construction paper and measuring with rulers. So far the students have used the senses of seeing and touching. They can also use the senses of smelling and tasting to obtain information. Encourage each student to draw a picture, provide a name, and write a description for his/her worm. Have volunteers share their work with the class. A variation of this activity is to compare a candy worm with a real worm. This provides an opportunity for students to determine differences between the living and the non-living.

References

Barry, Dana M., "Chem - Is - Tree," *Journal of Chemical Education*, **74**, 1175 (1997).

Barry, Dana M. (Copyright holder of music and lyrics) *Chemical Sensation with the Barry Tones* (1996).

Barry, Dana M., *Simple Chemistry*, Teacher Created Materials, Inc.: CA (1994).